Journal of Research on the Lepidoptera 11(4):229-234, 1972(1973)

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LIMENITIS WEIDEMEYERII ANGUSTIFASCIA X *L. ASTYANAX ARIZONENSIS* = (?) AB. *DOUDOROFFI* (GUNDER), 1934,

IN THE ALLAN HANCOCK FOUNDATION COLLECTION[1] (NYMPHALIDAE)

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The recent discovery by the authors of an unusual *Limenitis spp.* in the Allan Hancock Foundation (AHF) collection at the University of Southern California prompted a search through the literature in an attempt to ascertain its identity. Taken at Oak Creek Canyon (fig. 1), Coconino County, Arizona on June 1, 1942, by J. S. Garth, the specimen had been identified tentatively as *L. weidemeyerii angustifascia* ab. *sinefascia* Edwards, 1882; however, it did not compare favorably with the holotype of *sinefascia* in the United States National Museum (UNSM No. 33964: see Perkins & Perkins, 1967).

Unique in appearance, the example in question is characterized by a black suffusion of scales throughout the basal and discal areas of all wings dorsally. Only in the limbal area of the hind wing (HW) is a slight bluish iridescence perceptible. Additionally, the dorsal row of submarginal markings on the HW is comprised of discrete, minutely elliptical, white pupils that contrast strongly with the otherwise somber black ground color—this in contrast to the melanic crescents of *L. weidemeyerii angustifascia* (Barnes and McDunnough), 1912, and the iridescent lunules of *L. astyanax arizonensis* Edwards, 1882.

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[4]Gunder's designation "transition form" has no taxonomic standing, and dosPassos (1964) treated most such names as aberrations.

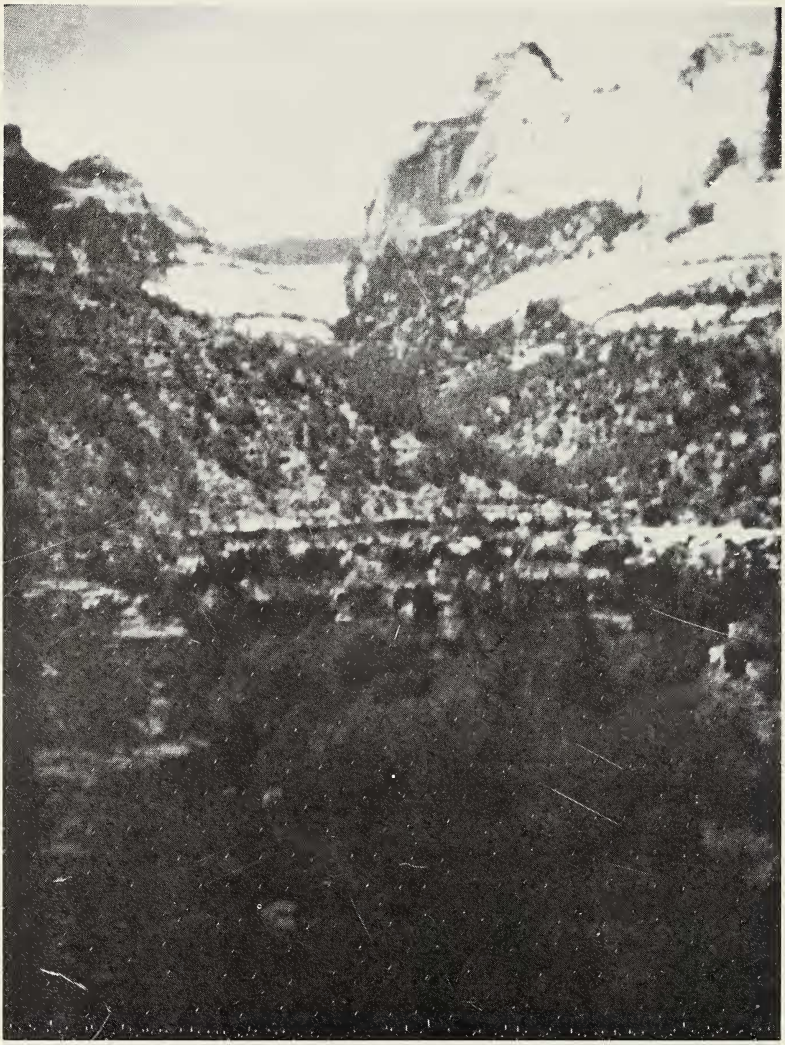

Fig. 1.—Looking north along the rim of Oak Creek Canyon, Coconino Co., Arizona, *ca.* 6,000 ft. elevation.

The specimen, however, also possesses characteristics in common with both *L. w. angustifascia* and *L. a. arizonensis.*

Like *angustifascia* dorsally (fig. 2), it exhibits 3-4 submarginal white spots in cells R_3-R_5 and M_1 in the apical arear of the forewing (FW), and lacks the characteristic *astyanax* suffusion of blue-green iridescent scales on the limbal area of the FW and discal areas of the FW and HW. Like *angustifascia* ventrally (fig. 3), it possesses 5-6 submarginal white spots in cells R_3-R_5 and M_1-M_3 in the apical area of the FW, and exhibits 5 postbasal and submedian spots on the HW. Two of these, well defined in cells R_5 and M_1, are situated directly cephalic to the larger, paired contiguous markings in the discal cell; unlike *angustifascia,* but like *arizonensis,* these markings are orange rather than white.

Like *arizonensis* dorsally and ventrally (fig. 2, 3), the specimen lacks the broad, median-postmedian white band on both FW and HW. Ventrally, it is similar to *arizonensis* in that the apical-subapical area of the FW is suffused with ferruginous—not black—scales; additionally it possesses a conspicuous series of orange, submarginal-postmedian lunules like *arizonensis* but unlike *angustifascia,* whose continuous submarginal-postmedian series of brick-red crescents resides lateral to the postmedian white band.

Consultation with Julian Donahue of the Department of Entomology at the Los Angeles County Museum of Natural History (LACM) and inspection of the Museum's collection yielded a specimen nearly identical to that in question; the only notable exception was the occurrence of white tufts of elongated scales in cell 2A in the region of the anal angle of the dorsal HW. Taken at Hannagan Meadows, White Mts., Greenlee County, Arizona, on July 21, 1941, by Fred W. Friday, it had been determined as *L. a. arizonensis* ab. *doudoroffi* (Gunder), 1934. Although terse, Gunder's original description generally coincides with those characters possessed by this and the Hancock specimen. Gunder treated *doudoroffi* as a transition form[4], the holotype of which was taken at Tonto Creek, near Payson, Gila County, Arizona on July 12, 1933, by M. Doudoroff.

Bauer (1954) also reported taking a comparable specimen in Arizona's Verde Valley. Based upon his description, it too possesses one characteristic in common with both the LACM specimen and AHF example that is unlike any other specimens described or mentioned heretofore; namely the occurrence of

moderately distinct, bluish-white spots that constitute a median row in cells M_2, M_3 and Cu_1 on the ventral FW.

It is tempting to speculate that the entity *doudoroffi* is not an aberration, as it is currently treated (dosPassos, 1964), but rather is a hybrid of *L. w. angustifascia* X *L. a. arizonensis*. Limited circumstantial evidence lends support to this hypothesis, as all such specimens manifest a combination of phenotypic color and patterning characters that are unique to one species or the other.

Altitude would appear to serve as an isolating mechanism. Bauer's 1954 report indicated that *arizonensis* was generally confined to the 4,000-5,000 foot levels (*e.g.*, Sedona, Arizona at 4,250 feet), whereas *angustifascia* resided at or above the 6,000-foot elevations (*e.g.*, Flagstaff, Arizona at 6,905 feet). However, it is known that the two species occasionally overlap and thus are capable of crossing such a barrier. Indeed, sympatry in in the region of Oak Creek Canyon (between Sedona and Flagstaff is not uncommon; *cf.*, G. Gorelick's July 29, 1969 records (J.L.S. "Season's Summary," 1970). Bauer (1954) reported collecting *Limenitis* larvae in the Oak Creek Canyon area on a narrow-leaved willow (*Salix*); those adults that emerged were both *arizonensis* and *angustifascia*. Given that either *arizonensis* flies from time to time up the canyon or *angustifascia* flies down, overlapping with resultant hybridization in this area is explicable. But how does one account for records of *doudoroffi* near the Mogollon Rim (vic. Payson, Gila County) or at Hannagan Meadows in the White Mts. of Greenlee County, where elevations vary between 6,000-8,000 feet? While it is generally known that the range of *arizonensis* includes the lower elevations of central and southeastern Arizona (Perkins and Perkins, in press), it is less well known that occasional records exist from higher elevations; *e.g.*, the collection of the LACM houses two specimens taken at Strayhorse Camp, White Mts., Greenlee County, Arizona, on June 28, 1937, by Don Meadows—a mere 13 miles from the locale at which the LACM example of *doudoroffi* was taken. C. Ferris (J.L.S. "Season's Summary", 1970) also reported the two species' being sympatric at Pine, Gila County, Arizona (elv. 8,000 feet), on September 1, 1969—this locale is *ca.* 12 miles N.E. of *doudoroffi's* type locale.

Although it is conjecture to speculate that *doudoroffi* is not an aberration but a hybrid, interspecific breeding experiments should be able to shed considerable light on this, as yet, unanswered question.

Fig. 2.—Top: *L. weidemeyerii angustifascia,* Kanabownits, Grand Canyon, Coconino Co., Arizona, 5.VIII.47 (LACM). Middle: *L. astyanax arizonensis* X *L. weidemeyerii angustifascia* = *doudoroffi* (?), Oak Creek Canyon, Coconino Co., Arizona, 1.VI.42 (AHF). Bottom: *L. astyanax arizonensis,* Madera Canyon, Santa Rita Mts., Santa Cruz Co., Arizona, 25.VIII.46 (LACM).

Fig. 3.—Lower surfaces of the specimens illustrated in Fig. 2.

All illustrations approximately x ¾

ACKNOWLEDGMENTS

The authors are indebted to Dr. W. D. Field (United States National Museum) and Drs. C. L. Hogue, J. P. Donahue, and R. Snelling (Los Angeles County Museum of Natural History) for the generous loan of material, without which this study could not have been possible.

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